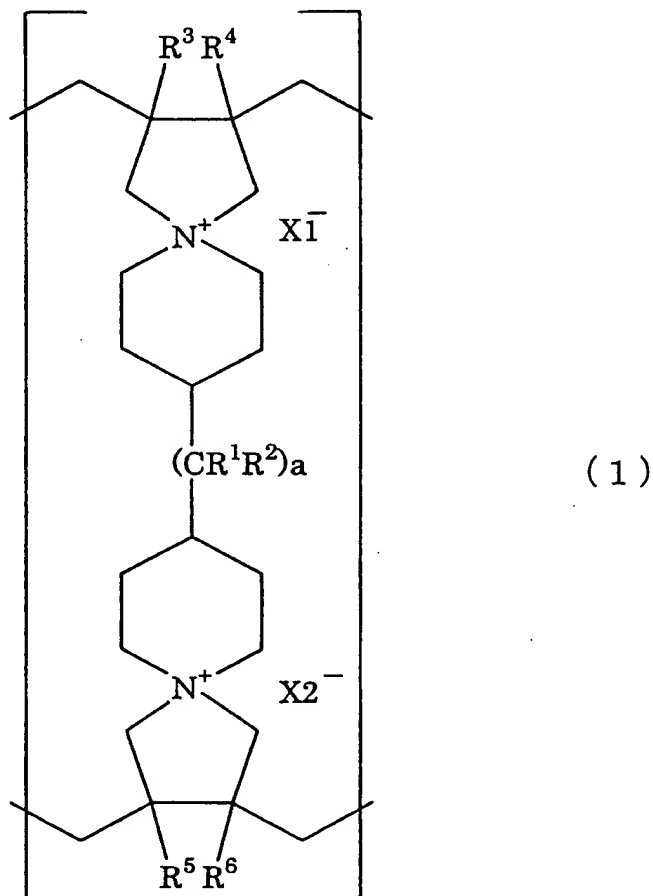


## CLAIMS

1. A crosslinked polymer having at least one crosslink structure and a tertiary amine structure and/or a quaternary ammonium salt structure,
- 5 ammonium salt structure,

wherein at least one crosslink structure is represented by the following general formula (1):

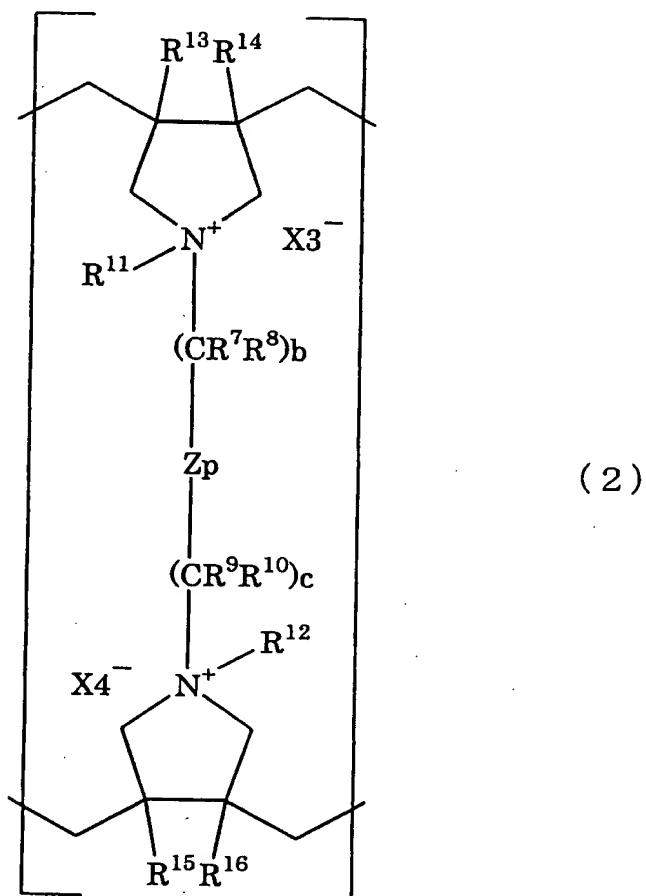


- 10 wherein  $R^1$  and  $R^2$  are the same or different and each represents a hydrogen or halogen atom or a  $C_{1-10}$  alkyl or hydroxyl group;  $R^3$ ,  $R^4$ ,  $R^5$  and  $R^6$  are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group;  $X1^-$  and  $X2^-$  are the same or different and each represents a halide ion,

a hydroxide ion or an organic or inorganic acid anion and a represents an integer of 0 to 10.

2. A crosslinked polymer having at least one crosslink structure and a tertiary amine structure and/or a quaternary ammonium salt structure,

wherein at least one crosslink structure is represented by the following general formula (2):

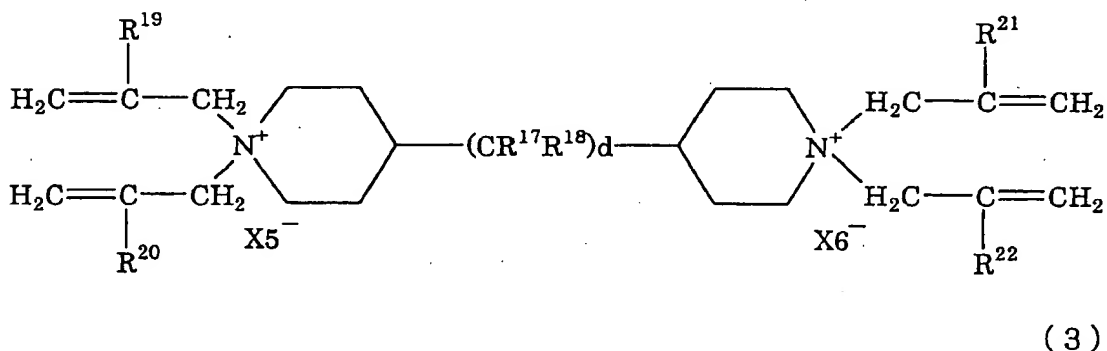


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wherein  $R^7$ ,  $R^8$ ,  $R^9$  and  $R^{10}$  are the same or different and each represents a hydrogen or halogen atom or a  $C_{1-10}$  alkyl or hydroxyl group;  $R^{11}$  and  $R^{12}$  are the same or different and each represents

- a C<sub>1-10</sub> alkyl group; R<sup>13</sup>, R<sup>14</sup>, R<sup>15</sup> and R<sup>16</sup> are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; X<sup>3-</sup> and X<sup>4-</sup> are the same or different and each represents a halide ion, a hydroxide ion or an organic or inorganic acid anion, b and c are the same or different and each represents an integer of 0 to 10; and p represents 0 or 1 provided that the relation  $b + c + p \geq 1$  should be satisfied; Z represents an -NH-, -N(CH<sub>3</sub>)-, -NH-(CH<sub>2</sub>)<sub>3</sub>-NH-, -NH-(CH<sub>2</sub>)<sub>4</sub>-NH-, -O-, -CH(OH)-, -O-CH<sub>2</sub>-C(CH<sub>3</sub>)<sub>2</sub>-CH<sub>2</sub>-O-, -O-(CH<sub>2</sub>)<sub>2</sub>-(O-CH<sub>2</sub>-CH<sub>2</sub>)<sub>n</sub>-O-, 1,4-piperazinylene, 3-methyl-2,6-pyridyl, 4-methyl-2,6-pyridyl, 2,6-pyridyl or 2,5-pyridyl group and n represents an integer of not less than 0.

3. A crosslinking agent having a structure represented by the following general formula (3):



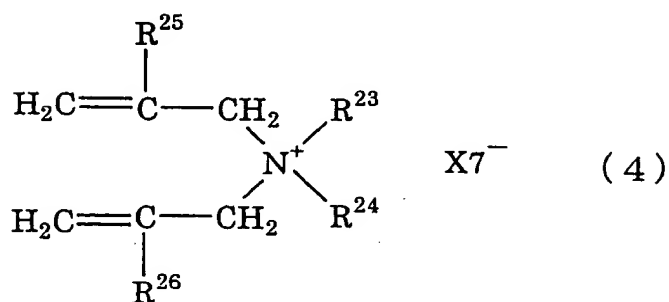
- wherein R<sup>17</sup> and R<sup>18</sup> are the same or different and each represents a hydrogen or halogen atom or a C<sub>1-10</sub> alkyl or hydroxyl group; R<sup>19</sup>, R<sup>20</sup>, R<sup>21</sup> and R<sup>22</sup> are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; X<sup>5-</sup> and X<sup>6-</sup> are the same or different and each represents a halide ion, a hydroxide ion or an organic or inorganic acid anion and d represents an integer of 0 to 10.

4. A method of producing the crosslinked polymer

according to Claim 1

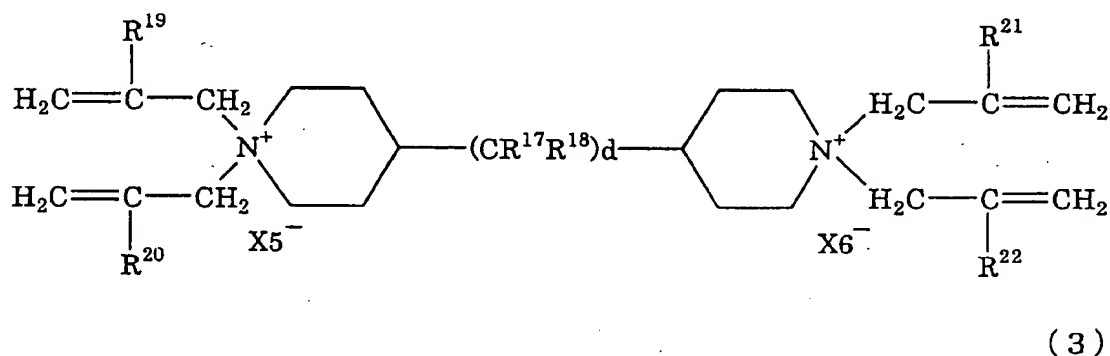
which comprises the step of suspension polymerization of a monomer composition comprising a monomer represented by the following general formula (4):

5



wherein  $\text{R}^{23}$  and  $\text{R}^{24}$  are the same or different and each represents a  $\text{C}_{1-10}$  alkyl group;  $\text{R}^{25}$  and  $\text{R}^{26}$  are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; and  $\text{X7}^-$  represents a halide ion, a hydroxide ion or an organic or inorganic acid anion,

10 and a crosslinking agent represented by the following general formula (3):



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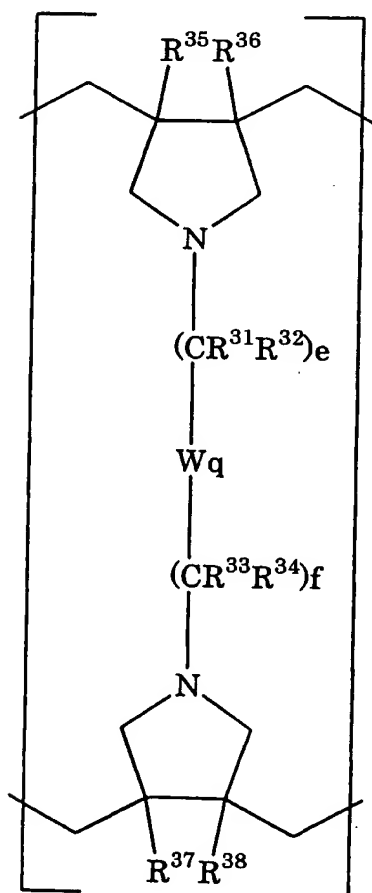
wherein  $\text{R}^{17}$  and  $\text{R}^{18}$  are the same or different and each represents a hydrogen or halogen atom or a  $\text{C}_{1-10}$  alkyl or hydroxyl group;  $\text{R}^{19}$ ,  $\text{R}^{20}$ ,  $\text{R}^{21}$  and  $\text{R}^{22}$  are the same or different and each represents

a hydrogen or halogen atom or a methyl or ethyl group;  $X5^-$  and  $X6^-$  are the same or different and each represents a halide ion, a hydroxide ion or an organic or inorganic acid anion; and d represents an integer of 0 to 10.

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5. A method of producing the crosslinked polymer according to Claim 2

which comprises the step of quaternizing a crosslinked polymer having at least one crosslink structure and a tertiary amine structure and/or a quaternary ammonium salt structure,  
 10 at least one crosslink structure being represented by the general formula (5):



(5)

wherein  $R^{31}$ ,  $R^{32}$ ,  $R^{33}$  and  $R^{34}$  are the same or different and each represents a hydrogen or halogen atom or a  $C_{1-10}$  alkyl or hydroxyl group;  $R^{35}$ ,  $R^{36}$ ,  $R^{37}$  and  $R^{38}$  are the same or different and each  
 5 represents a hydrogen or halogen atom or a methyl or ethyl group; e and f are the same or different and each represents an integer of 0 to 10; and q represents 0 or 1 provided that the relation  $e + f + q \geq 1$  should be satisfied; W represents an -NH-, -N(CH<sub>3</sub>)-, -NH-(CH<sub>2</sub>)<sub>3</sub>-NH-, -NH-(CH<sub>2</sub>)<sub>4</sub>-NH-, -O-, -CH(OH)-, -O-CH<sub>2</sub>-  
 10 C(CH<sub>3</sub>)<sub>2</sub>-CH<sub>2</sub>-O-, -O-(CH<sub>2</sub>)<sub>2</sub>-(O-CH<sub>2</sub>-CH<sub>2</sub>)<sub>m</sub>-O-, 1,4-piperazinylene, 3-methyl-2,6-pyridyl, 4-methyl-2,6-pyridyl, 2,6-pyridyl or 2,5-pyridyl group and m represents an integer of not less than 0.

15 6. A method of producing a spherical particle in a medium

wherein said medium comprises a viscous fluid.

20 7. The method of producing a spherical particle according to Claim 6,

wherein said viscous fluid comprises a liquid paraffin and/or a silicone oil.

25 8. A method of using the crosslinked polymer according to Claim 1 or 2 in a reaction step

wherein said reaction step is a step of carrying out an ion exchange reaction or a step of carrying out a reaction for activating an active hydrogen atom in an active hydrogen-containing compound.

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9. A method of producing a hydroxy alkyl (meth)acrylate by the reaction of a (meth)acrylic acid with an oxirane compound,

35 wherein the crosslinked polymer according to Claim 1 or 2 is used as a catalyst.

10. A method of producing glycols by the reaction of water with an oxirane compound,

5 wherein the crosslinked polymer according to Claim 1 or 2 is used as a catalyst.

11. A method of producing glycols by the reaction of an oxirane compound with water in the presence of a crosslinked polymer

10 wherein said crosslinked polymer comprises an organic high-molecular compound having a hetero atom, as an essential member, in the main chain and/or crosslink structure,

said organic high-molecular compound not having a hydrogen directly bonded to a hetero atom.

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12. The method of producing glycols according to Claim 11,

20 wherein said organic high-molecular compound has a repeating unit having, as the main constituent of the main chain thereof, a quaternary ammonium salt structure composed of a diallyldimethylammonium salt.